STCG Subcon Subgroup Meeting Minutes

October 17, 2001

Welcome/Announcements (Arlene Tortoso)

Arlene opened the meeting and introductions were made around the room. We will now have three Co-Chairs for the Subcon Subgroup: Arlene Tortoso, Rob Yasek, and John Sands (who will take over the 100-Area Groundwater projects).

Several announcements were made:

- The week of October 25, SCFA will be at Hanford to review our S&T needs. All the Focus Areas will be here for three days to participate in the Hanford S&T Needs Workshop. There will be a wine tasting social event on Tuesday evening and a special session with SCFA on Thursday.
- The ARA kick-off meeting will be held on October 22 at 1:00 p.m.
- On November 5-8, there will be an EMSP workshop at EMSL for Groundwater/Vadose Zone and Tanks.

Arlene talked with Malcolm Segal (the SNL facilitator for the ITRD projects) about action items for the Carbon Tet and N-Area ITRD Projects. The ITRD funding is either gone or significantly reduced, so it will be hard for him to finish the final reports. However, he knows we need the information for the five-year CERCLA review and will try hard to complete the reports. The N-Area final report is due in mid-November, and the status report on Carbon Tet is due in late November.

Review Minutes from Last Meeting (Facilitator)

The facilitator reviewed the minutes from the August 22, 2001 meeting. No changes were requested, so the minutes stand as written.

RAHCO Subsurface Containment System Technology (Tom Crocker)

Greg Barber was the RAHCO Project Manager for the Subsurface Containment System developed for NETL between September 1999 and November 2001. He made some introductory comments before turning the presentation over to Tom Crocker, the Principal Investigator for this work. Greg explained that RAHCO is an engineering/manufacturing firm in north Spokane that makes large, custom, one-of-a-kind machines, mainly for the mining and construction industries. They have been involved in highway paving, mobile conveyors, coal mining, and some remote retrieval of waste at Idaho Falls.

Tom Crocker showed a photo of the Oak Ridge Bear Creek Valley burial grounds that illustrated the commonality of waste constituents around the DOE Complex. Between 1952 and 1970, DOE buried mixed waste in pits and trenches. Three million cubic meters of buried waste across the Complex are becoming harmful to human health and safety and, and these problems need to be addressed. Some

burial grounds contain plutonium and pyrophorics. Drums rust and the wastes leak out over time, and groundwater fluctuations cause groundwater contamination problems.

RAHCO's proposed solution is to cocoon the waste (i.e., encapsulate it in place with a RCRA cover). They surround the waste with a nearly impermeable barrier and monitor the performance of the barrier over its lifespan. They have the expertise for construction and installation of a horizontal barrier below the waste, in conjunction with a long-term monitoring system. They use commercially available geosynthetic materials for the barriers (both vertical and horizontal) and well-proven joint-sealing technology to form a continuous barrier. They use both conventional and specialized construction equipment in constructing the barriers. They install the horizontal barrier strips as the equipment proceeds. The cutterheads can be modified to suit the local geological conditions. They also have PC-based control and data acquisition systems with real-time trending ability. There is enough room to put instrumentation into the space below the horizontal barrier. This process is similar to canal construction or a tunnel-boring process.

DOE is moving away from full-sale retrieval of buried waste across the Complex. Tom believes that this containment system is cheaper than retrieval of Hanford's buried waste and disposal in ERDF. Scott McMullin (SCFA) says the life expectancy of this system is at least 50 years, and maybe even 100 years. The system should be operated for two shifts per day and maintenance should be done on the third shift. They have had four years of equipment testing to:

- Verify safe operation
- Verify equipment design principles
- Validate functional performance
- Obtain system performance data.

They have done an ASME peer review and have conducted 10 major tests that were successful. They have convinced a lot of people that this is a viable system that meets all DOE requirements. Still, people want to know how you can guarantee that the barrier will be effective. Tom responded that there is a six-inch overlap with the bentonite. The material swells to about 15 times its original size. Compression of the soil also helps strengthen the barrier.

RAHCO is looking for a full-scale demonstration of their Subsurface Containment System at a DOE site. Tom asked the group if they saw an application for this technology at Hanford. Dib Goswami (Ecology) said he sees applications in the 200 Areas, but a 50-year life isn't long enough; 100 years is better.

Tom stated that they use all dry electric cutting with dust suppression. No water or slurries are used. They can go to any depth as long as there is shoring (100 feet is OK). There is no limitation on the width of the machine either. They could even make a sloping design if there is room between the trenches.

Endorsement of FY02 S&T Needs (Scott Petersen)

Scott presented a table showing the FY02 subsurface contaminants technology needs statement changes. We deleted RL-SS02, RL-SS23, RL-SS05, and RL-SS24 this year and will need to provide an explanation for the IPABS database. Jim Hanson also noted that there might be a Corporate Performance Measure on disposition of needs. Scott mentioned that we updated the groundwater needs to include the potential for natural attenuation. We added three new needs and substantially revised two needs to include a TRU component and 618-10/11-specific information. New words were incorporated under "Stakeholder Concerns" thanks to Gordon Rogers.

Mark Freshley stated that there was not much emphasis on changing the needs this year. The Groundwater/Vadose Zone Integration Project is planning a series of workshops to update the S&T roadmaps based on NAS comments and feedback from the SAC analysis. Then they plan to update the needs. They also plan to hold a workshop to develop the needs for the groundwater remediation element in late November and early December.

The FY02 needs were endorsed by the Subgroup. It was mentioned that there might be some additional comments from Fred Mann (ORP) related to covers. Rob Yasek took an action to check on this.

Jim Hanson stated that the ASTD call for proposals was released. RL and ORP are each limited to only three proposals. Possible candidates that Jim is aware of include:

- Last year's Quick Wins proposal on carbon tet in the 200 Area (Savannah River, Pantex, Oak Ridge, and Hanford multi-site deployments).
- ORP may have a surface barrier proposal to submit, and we need to be involved. Scott needs to coordinate with CHG on this.
- FH has a list of 10-13 proposals to narrow down.

Awards are expected at the end of FY02. Since transition planning is getting started, RL may want to look for other opportunities to partner with ORP for this ASTD call.

SCFA Technical Targets Update (Jerry White)

The Technical Targets Team met in Golden in July and Scott Petersen was there. They identified 14 Technical Targets to focus on. There was also a late August meeting in Charlotte to:

- Present the Technical Targets concept to a broader audience (HQ, SCFA, end-users) to get agreement on the approach
- Discuss how to implement the approach.

At the second meeting, SCFA, HQ, and the end-users each committed to certain things. The SCFA Lead Lab will implement the approach. It looks good, but is 14 the right number of targets? They may do some roll-ups. Brian Looney was to clean up the list. A November meeting was planned to finalize implementation plans.

Since Bechtel is operating at five DOE sites, they provided input from the end-user perspective. The Bechtel Technology Panel developed a list of eight Priority Problem Areas for SCFA. The Priority Problem Areas were cross-referenced to the 14 Technical Targets. They were different slices, but

everything matched up. This information was presented to SCFA and Brian Looney will incorporate it into the Technical Targets.

Bechtel's recommendation was to develop a roadmap (actions on a timeline) for each Technical Target using a small team for a couple of days in the October-November time frame. The Roadmap team should include SCFA, the Lead Lab, the end-users, and the scientific community. They want to produce the initial roadmaps by next spring. Mark Freshley noted that the Hanford Groundwater/Vadose Zone Roadmap will also be done in the spring.

SCFA needs to crosscheck all site needs against the Technical Targets. In the future, we will need to relate our S&T needs to the Technical Targets. Gerald Boyd may ask the other Focus Areas to develop Technical Targets as well.

Bechtel also provided input to SCFA on how to overhaul their prioritization approach (see three attached files at the end of these minutes). The following are some key points to understanding the Bechtel approach.

1. Bechtel wanted to make it clear which part of the funding/planning process that their prioritization approach was focused on. They felt that the prioritization could only directly impact the SCFA process, not the overall EM-50 approach.

2. Bechtel feels strongly that the near-term activities, such as ASTD, Lead Lab technical assistance, ITRD, etc., should continue and that it would be difficult to prioritize these elements against the Technical Targets. Therefore, Bechtel proposes that a slice of program funding be set aside for these activities.

3. Bechtel's prioritization approach is focused on the Technical Targets and assumes that mini-roadmaps from the Technical Targets would be in place. Decisions on funding the individual problem elements identified by the roadmaps are what the prioritization process is intended to accomplish.

4. Bechtel wanted the process to be simple, easy to use, and easy to explain/defend. They basically focused on three elements; 1) the EM-50 investment required; 2) the multi-site relevance of the proposed work; and 3) the potential for success.

5. Bechtel did not want the system to be so complicated that it spit out an answer and SCFA simply implemented the answer. They felt that SCFA should use some judgment in making final selections for funding, to consider elements that simply cannot be built into a prioritization process effectively (e.g., political concerns, opportunity windows).

6. The example in the attached file is provided to illustrate how the prioritization process would be applied.

NETL Activities Update (Scott Petersen)

BHI was to meet with ARA on October 22 regarding the scope and schedule of their NETL-funded activities to enhance the penetration capabilities of the cone penetrometer (CPT). They are planning on doing this by augmenting the CPT with ODEX drilling and combining a laser with the CPT.

There is a new Request for Proposals from NETL to industry to address alternative technologies to emplace the In Situ Redox Manipulation barrier. The due date for proposals is December 17, 2001. We will have the opportunity to review proposals shortly after the beginning of the calendar year.

Update Uranium Plume (Scott Petersen)

In September, MSE collected vadose zone CO_2 samples with the cone penetrometer to use in the geochemical model of the uranium plume. There are no results yet. This fiscal year, MSE will be evaluating the data and working on a refined conceptual model for the mobility of uranium in the 200-West Area.

FY01 Technology Deployments (Scott Petersen)

The ERC had 12 Subcon-related technology deployments in FY01**:**

- Surveillance and Measurement (SAMS**)** – real-time isotopic analysis to near cleanup levels of soil sites.
- Guzzler Vacuum Truck Excavator for Uranium Characterization – vacuum-excavated soil for characterizing the vertical profile of uranium concentration (in an area with underground utilities where conventional excavation wasn't possible).
- Polyshield SS-100 - a fixative coating to prevent contamination spread.
- Water Flux Meter – in situ measurement of water flux into the vadose zone
- Advanced Tensiometer – in situ measurement of water
- Subsurface CO2 Sampling System – trailer-mounted system to collect and analyze CO2
- Cone Sipper – deployed on the cone penetrometer to collect soil gas samples from the subsurface
- Alpha Environmental Continuous Air Monitor – remote air-monitoring system with real-time results
- Electronic Dosimeter and Remote Monitoring System – used for Subcon and D&D applications
- Helium Soil Gas Analysis for Determination of Tritium Plumes – deployed on the geoprobe and could go on the cone penetrometer
- Colloidal Borescope – to determine the groundwater flow direction and magnitude
- ICP/MS for Uranium Isotopes in Groundwater – can be used to trace the source of uranium plumes.

Jim Hanson promised to provide the URL for BHI documents on Technology Insertion Points in the next monthly newsletter.

Attendees

Greg Barber (RAHCO International)
Bill Bonner (PNNL)
Craig Cameron (EPA)
Tom Crocker (RAHCO International)
Linda Fassbender (PNNL)
Dennis Faulk (EPA)
Tom Ferns (DOE/TFA)
Bruce Ford (BHI)
Mark Freshley (PNNL)
Dib Goswami (Ecology)
Ron Jackson (BHI)
Ken Kapsi (DOE-RL)
Wayne Martin (PNNL)
Scott Petersen (BHI)
Gordon Rogers (HAB)
John Sands (DOE/ERD)
Arlene Tortoso (DOE-WMD)
Jerry White (BHI)
Rob Yasek (DOE-ORP)

Action Items

- Add John Sands to the Subcon Subgroup distribution list (facilitator). Done
- Send copies of handouts to Dirk Dunning, Wade Riggsbee, and Dan Landeen (facilitator). Done.
- Schedule meeting room for December 12 (facilitator). Done.
- Check on possible comments on the FY02 S&T needs from Fred Mann related to covers (Rob Yasek).
- Coordinate with CHG on potential ORP surface barrier proposal for the ASTD call (Scott Petersen).
- Provide the URL for BHI documents on Technology Insertion Points in the next monthly newsletter (Jim Hanson).

Next Meeting

The next Subcon Subgroup meeting was scheduled for December 12. Potential agenda items that were mentioned include:

- Report on TIE Conference (Jim Hanson)
- Report on EMSP Workshops (Mark Freshley)
- Report on SCFA Technical Targets Meetings (Jerry White)

SCFA Prioritization Criteria Proposal – Bechtel Technology Panel

S&T Program Planning Levels

The Bechtel Technology Panel (BTP) recognizes that planning decisions for science and technology activities as part of the Office of Science and Technology are made at three levels. The highest planning level decision is for the amount of funding each Focus Area will receive (currently the Work Package Ranking System and Integrated Priority List). The second planning level decision is for how the Focus Area will fund its program plan (currently the Multi-Year Program Plan). The third planning level decision is for which specific projects to fund (e.g., which TTPs to select). The BTP input for prioritization of these decisions is primarily focused on the program planning decision (planning level 2), but should also impact the other two decision levels. Figure 1 shows these planning decisions as well as a proposed system for incorporation of end-user information into the overall decision structure.

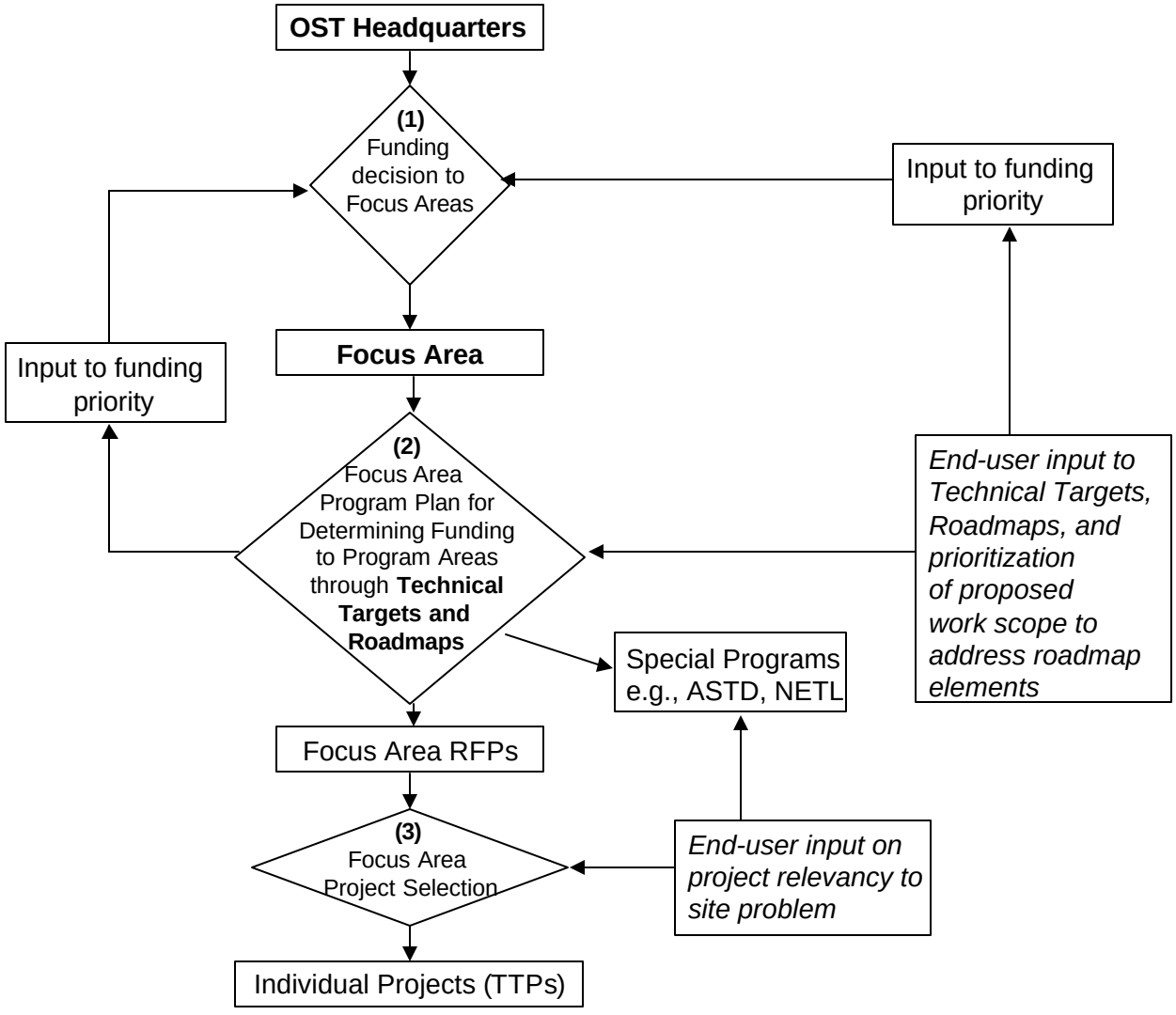

Figure 1. Bechtel Technology Panel Summary of the Overall Decision Process and Planning Levels ( ) for the Science and Technology Program

Focus Area Work Scope Categories

The Focus Area needs to manage work in several different categories to meet its objectives. The BTP views these categories as depicted in Figure 2. All of these categories are important to the end users. The BTP recommends that relative funding amounts for these three categories be identified within the Focus Area program plan. Prioritization of work within these categories should be tailored to the general type of work and objectives within the category. For instance, direct end user input on project relevancy is the most important input for the short-term special programs. Technical Targets and Roadmaps are recommended to organize work for the mid- and long-term Focus Area programs. *End user input to the roadmapping process and to set priority of individual roadmap elements is considered essential by the BTP*. The proposed prioritization process for the roadmap elements is described in the next section.

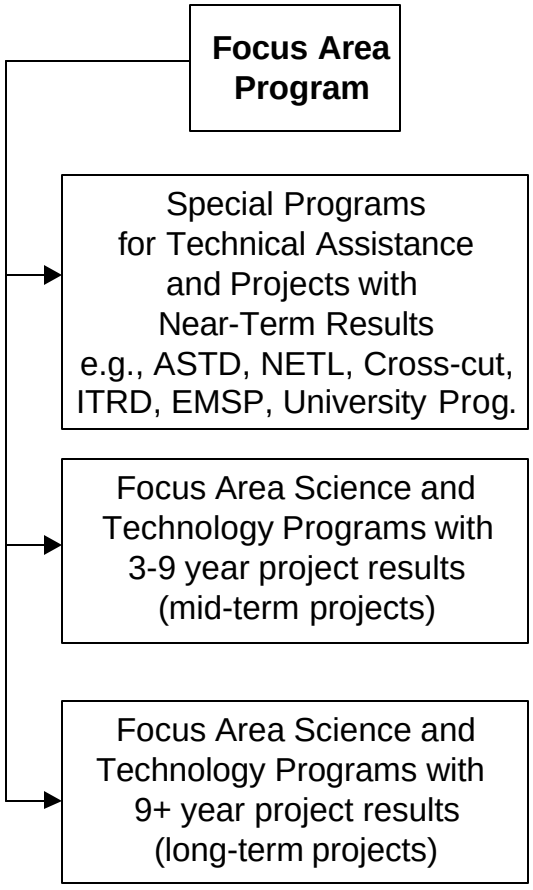

Figure 2. Bechtel Technology Panel View of the Categories of Work within a Focus Area

Proposed Prioritization Criteria

The proposed prioritization criteria are for prioritization of roadmap elements within the Focus Area Technical Target implementation. Roadmap elements are not necessarily individual projects, but describe the work scope needed to overcome an issue within a roadmap. A schematic of how BTP envisions roadmaps and roadmap elements is outlined in Figure 3. As shown in Figure 1, the BTP recommends end user input on prioritization primarily at the Focus Area program planning level (planning level 2). End user input to special programs and near-term projects (see Figure 2) and individual proposed TTPs should be in terms of determining the relevance of the work to the end user.

The following prioritization is most relevant for the mid- and long-term programs identified in Figure 2. The BTP recommends the following prioritization process inputs.

Input 1:

Individual Site Significance of Roadmap Elements - Four criteria are recommended to indicate the significance of the proposed work to the end user. These establish direct feedback from the sites on the S&T work scope proposed to address roadmap elements.

Criterion 1) size of roadblock addressed by roadmap element based on: 1) cost, 2) technical difficulty, 3) safety, and 4) schedule sub-elements – Input by end users

Criterion 2) regulatory drivers based on whether the roadmap element will impact a significant milestone – Input by end users

Criterion 3) size of overall problem addressed (e.g., baseline project life-cycle cost) – input by end users

Criterion 4) a confidence estimate factor value for proposed work quantified in a simple manner (e.g., 1 [unsure of ability to succeed], 2 [may succeed], or 3 [likely to succeed]) – input by end user and Focus Area technical reviewers

Input 2:

Multi-Site Relevance – Multi-site relevance should be determined by adding the individual site significance criteria 1, 2, and 3 rating values together

Input 3:

Program Planning Roadmap Element Comparison - A comparison parameter should be calculated as the relative measure of the cost/benefit value of the proposed work. This comparison parameter should include consideration of the required EM-50 investment, the multi-site relevance of the proposed work (input 2), and an estimate of the ability of the S&T to meet S&T objective (input 1, criterion 4). *This comparison parameter, the multi-site relevance, the individual site significance, and the overall roadmap should be considered together in determining the funding priority of a roadmap element.* Attachment 1 shows an example of how these prioritization inputs could be applied.

The BTP is presenting these recommendations because the end users will be asked for data to support this prioritization (e.g., currently through IPABS) and the BTP recommends that a focused set of inputs based primarily on end user data are used as the primary factors in Focus Area program planning decisions.

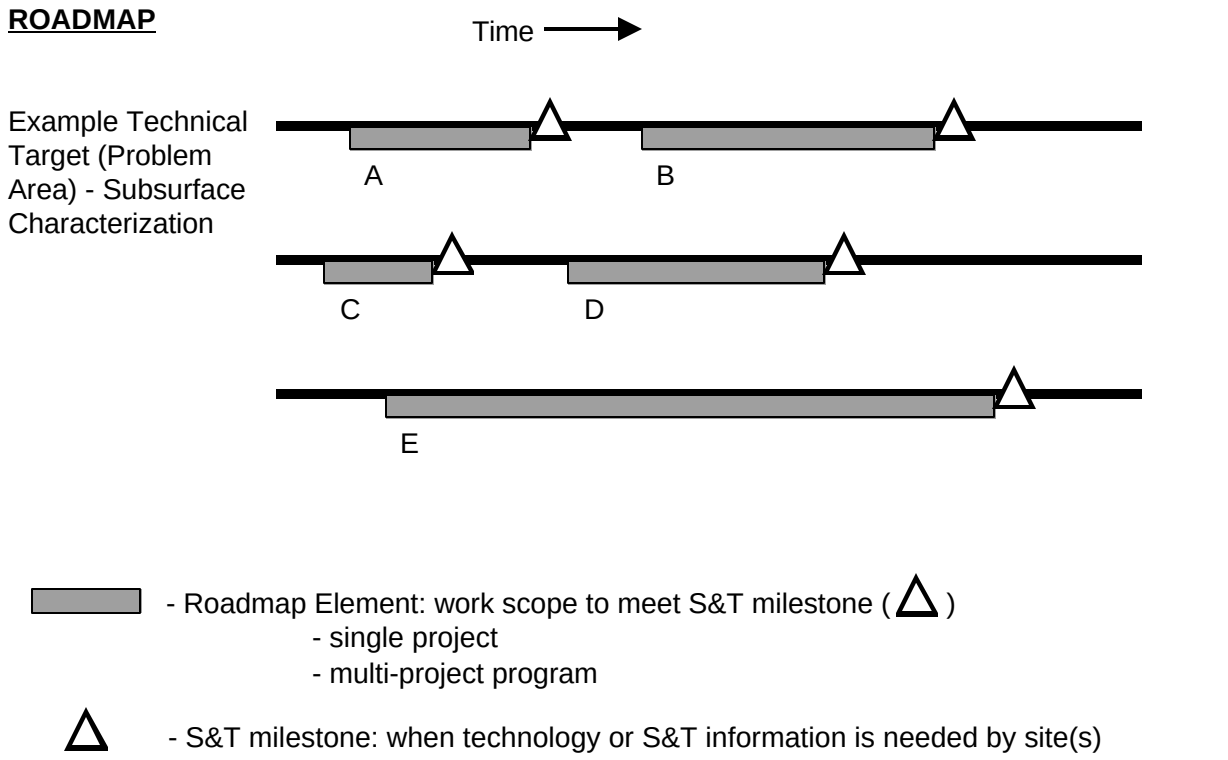

Figure 3. General Components of Roadmap Process for Technical Targets

Attachment 1 – Example of Applying Prioritization for Program Planning within the Mid-Term Focus Area Program Category

Input 1: Individual Site Significance of Roadmap Element – Point value determined based on the following criteria.

1) Size of roadblock addressed by roadmap element based on: 1) cost, 2) technical difficulty, 3) safety, and 4) schedule sub-elements – point value of each sub-element rating 1 [low] to 3 [high] (maximum total = 12) – input by end users
2) Regulatory drivers based on whether the roadmap element will impact a significant milestone – point value rating 1 [low significance] to 3 [high significance] – input by end users
3) Size of overall problem addressed (e.g., baseline project life-cycle cost) – point value rating 1 [<10M], 5 [<100M], and 10 [>100M] – input by end users
4) A confidence estimate factor value for proposed work quantified simply (e.g., 1 [unsure of ability to succeed], 2 [may succeed], or 3 [likely to succeed]) – input by end user and Focus Area technical reviewers

Input 2: Multi-site Relevance – Point value total of all individual site significance criteria 1, 2, and 3 rating values added together for a given roadmap element (e.g., how widespread and significant is the roadmap element need among sites).

Input 3: Focus Area Program Planning Prioritization – A comparison parameter could be calculated as the estimated EM-50 funding required divided by the multi-site relevance and a confidence estimate factor [$/(multi-site relevance * confidence factor)]. A roadmap element with a *lower* numerical score of this parameter indicates that the EM-50 effort to solve the roadmap element has a good return on investment and may be preferred for funding over other roadmap elements with higher numerical scores. This parameter is intended to give guidance on the return on investment of proposed work, but should not be used as the only factor in determining which work to fund. In the example shown below, roadmap element 3 offers the best return on investment.

Example

Roadmap Element 1: to address this element, a long-term science project of 6 years at $400K/yr is needed, EM-50 cost = $2.4M, may succeed point value of 2, multi-site relevance rating value of 55. Criterion 3 Score = $21,818 [2.4M/(55*2)]

Roadmap Element 2: to address this element, a short-term technology demonstration for 2 years at $1M/yr is needed, EM-50 cost = $2M, likely to succeed point value of 3, multi-site relevance rating value of 38. Criterion 3 Score = $17,543 [2M/(38*3)]

Roadmap Element 3: to address this element, a long-term science project of 6 years at $250K/yr is needed, EM-50 cost = $1.5M, may succeed point value of 2, multi-site relevance rating value of 75. Criterion 3 Score = $10,000 [1.5M/(75*2)]

SCFA Technical Targets from Golden, CO. Meeting

July, 2001

1. Metals and Radionuclides Source Zone Stabilization and Treatment
2. Organic Source Zone Stabilization and Treatment
3. Design, Construct, and Verify Long-Term Containment Systems
4. Subsurface Access and Delivery
5. Methods to Verify and Validate Performance
6. Improving the Technical Basis for Setting Remediation Goals
7. Biogeochemical Processes that Determine Contaminant Fate
8. Treatment of Primary Plumes
9. Sustainable Technologies for Dilute Plumes
10. Tritium Management and Risk Reduction
11. Techniques and Technologies that Support Characterization
12. Strongly Heterogeneous Systems
13. Fundamental Processes
14. Integrated Storage-Treatment Concepts-"Smart Storage"

Bechtel Technology Panel

Environmental Restoration Priority Problem Areas and Key Technical Areas for Resolution

Problem Area 1. *Fate and Transport*

- Support for Natural Attenuation
- Transport Phenomena (vadose zone)
- Improved modeling
- Improved risk predictions and defensibility
- Data fusion (meld data from multiple technology inputs)
- Realistic end state definition

Referenced Technical Targets: 6, 7, 12 13

Problem Area 2. *In situ Monitoring*

- Deep access
- Sensors
- Real time
- Autonomous
- Long-term monitoring

Referenced Technical Targets: 4, 5, 11

Problem Area 3. *Subsurface Characterization*

- Real time sensors
- Under obstructions (buildings, pipes, etc.)
- Large area and vertical profiling
- Buried waste characterization
- Data fusion (meld data from multiple technology inputs)
- Deep access
- Groundwater sampling techniques (purge water management)

Referenced Technical Targets: 4, 5, 11

Problem Area 4. *Surface Covers/Barriers*

- Performance monitoring
- Design approach (long-term performance)
- Subsidence
- Arid
- Humid
- Maintenance/repair

Referenced Technical Targets: 3, 5

Problem Area 5. *Groundwater management/remediation*

- In situ remediation
- Groundwater performance monitoring
- DNAPLs
- Delivery systems
- Large plume management
- Passive remediation
- Tritium management
- Barrier design/maintenance
- Deep access

Referenced Technical Targets: 2, 4, 5, 8, 9, 10

Problem Area 6. *In situ stabilization*

- Improvement to and alternatives to grouting
- Delivery systems
- Performance monitoring
- Buried waste
- Subsurface containment barriers
- Large volumes of soil

Referenced Technical Targets: 1, 4, 5

Problem Area 7. *Vadose Remediation*

- Metals and Radionuclides
- DNAPLs
- VOCs
- Delivery systems
- Soil Management
- Deep access

Referenced Technical Targets: 1, 2, 4

Problem Area 8. *Buried Waste Retrieval*

- Contamination control
- Remote handling
- Waste segregation
- Shock and pyrophoric
- Criticality control

Referenced Technical Targets: 1